
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

In re application of: Phil DELURGIO et al.

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APPEAL BRIEF UNDER 37 C.F.R. 41.37

Further to Notice of Appeal filed in this application on March 25, 2009, this Appeal Brief is being submitted to the Board of Patent Appeals and Interferences.

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Dear Sirs:

Appellants hereby appeal the decision of the primary examiner mailed November 26, 2008. The Appeal Board is thanked for their review of the application.

I. REAL PARTY IN INTEREST

The real party in interest is DemandTec Corporation, a corporation of the state of Delaware, the assignee of all rights, title and interest in the present application from applicants Phil Delurgio, Suzanne Valentine, Michael Neal, Krishna Venkatraman, and Hau Lee recorded in the United States Patent and Trademark Office, at Reel/Frame 011738/0295.

II. RELATED APPEALS AND INTERFERENCES

Based upon information and belief, there are no appeals or interferences that could directly affect or be directly affected by or have a bearing on the decision by the Board of Patent Appeals and Interferences in the pending appeal.

III. STATUS OF THE CLAIMS

The final rejection of Claims 3, 4, 6, 11, 12 and 14-23 is being appealed. These appealed claims are reproduced in the Claims Appendix hereto. Original claims 3 and 4 remain in the present application. Status of the claims is as follows:

- a) Claims 3, 4, 6, 11, 12 and 14-23 have been rejected.
- b) Claims 1, 2, 5 and 7-10 have been previously withdrawn. Claim 13 has been previously cancelled.
- c) All rejected claims 3, 4, 6, 11, 12 and 14-23 are being appealed.

IV. STATUS OF THE AMENDMENTS

No amendment has been filed since the mailing on November 26, 2008 of the final Office Action herein.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

A. Regarding Independent Claim 3

The appealed independent Claim 3 relates to the pricing of products for retailers and wholesalers. (page 2, lines 15-18). Proper pricing of goods and services is integral to the success of a business. As such, pricing systems, including price optimization systems, are highly valued by businesses and fulfill an important role in business decision making and planning.

Claim 3 of this application addresses an apparatus for modeling costs for a plurality of products. (page 3, lines 17-20). This method is unique in that cost models and optimized prices are generated for **demand groups** of products. (page 81, lines 19-22; page 116, lines 1-4). These demand grouping categories are groupings of highly substitutable products. (page 13, lines 14-21).

Furthermore, the present invention discloses the “imputation” of variables for use in pricing optimization and the generation of the cost model. (page 28, lines 10-17; page 74, lines 1-5).

Thus, the apparatus is capable of generating the cost model and price optimizations on demand groups under data poor conditions in a manner unrivaled by other price setting systems. (page 13, lines 14 to page 14, line 1; page 28, lines 10-17).

The benefit of generating the product cost model in this fashion is that the invention sidesteps the need to generate costs for each individual product, but rather generates cost data for a lesser number of demand groups. The cost model along with a demand model and market

share model may then be used to determine individual product sales models for product price optimization.

Other systems require generating costs for each product to generate cost models for those products. This may be extremely costly in terms of time and computing resources. As such, the present invention provides a dramatic improvement over prior cost modeling systems.

In particular, Claim 3 states:

“An apparatus for modeling costs,” See the specification as filed at page 4, lines 1-5; Figure 1, part 100; Figure 2, parts 216 to 232.

“useful in association with an optimization engine” See the specification as filed at page 4, lines 1-5; Figure 1, part 112.

“and at least one merchandise store” See the specification as filed at page 10, lines 5-12; Figure 1, part 124.

“coupled to the apparatus via a network,” See the specification as filed at page 118, lines 14-22; Figure 8, part 800.

“wherein the at least one merchandise store includes at least one of a brick-and-mortar store, an online store, and a catalog store,” See the specification as filed at page 10, lines 5-12; Figure 1, part 124.

“and wherein the optimization engine is configured to receive input from the apparatus,” See the specification as filed at page 10, lines 19-23; Figure 2, parts 212 and 224.

“and wherein the optimization engine is further configured to generate a preferred set of prices, the apparatus comprising:” See the specification as filed at page 10, lines 19-23; Figure 2, part 232.

“an econometric engine” See the specification as filed at page 9, lines 2-14; Figure 1, part 104.

“for receiving sales data from at least one merchandise store via the network,” See the specification as filed at page 9, lines 17-20; Figure 2, part 204.

“cleansing the sales data” See the specification as filed at page 12, lines 16-20; Figure 10, parts 1015, 1019, 1027 and 1031.

“and **generating imputed variables** by imputing at least one missing data point; and” (Emphasis Added). See the specification as filed at page 28, lines 10-17; Figure 10, part 1033.

“a financial engine for receiving imputed variables from the econometric engine,” See the specification as filed at page 72, lines 1-5; Figure 1, part 108.

“receiving cost data from at least one merchandise store via the network,” See the specification as filed at page 10, lines 5-10; Figure 2, part 216.

“generating a cost model for at least one product, and” See the specification as filed at page 10, lines 10-12; Figure 2, part 220.

“outputting the cost model to the optimization engine,” See the specification as filed at page 10, lines 14-15; Figure 2, part 224.

“wherein **the cost model models costs** of the at least one product **given** the merchandise store, **a demand group** and a selected time period, and” (Emphasis Added). See the specification as filed at page 75, lines 3-20; Figure 2, part 220; Figure 10, part 1023.

“wherein **the demand group is a group of highly substitutable products.**” (Emphasis Added). See the specification as filed at page 13, lines 14-21; Figure 10, part 1023.

B. Regarding Dependent Claims 4, 6, 11, 12 and 14-23

Claim 4 states “wherein the financial engine estimates inventory space in the at least one merchandise store used by a product from the sales data and delivery data.” See the specification as filed at page 75, lines 12-15.

Claim 6 states “wherein the imputed variables include at least one of a seasonality variable, a promotional variable and a cross-elasticity variable.” See the specification as filed at page 49, lines 1-12; page 52, lines 6-12; page 54, lines 9-17; also see Figures 18, 19A and 20.

Claim 11 states “wherein the cost model includes fixed costs and variable costs, further wherein the variable costs are a function of the amount of sales of the product and the fixed costs are not a function of the amount of sales of the product.” See the specification as filed at page 74, line 22 to page 75, line 3.

Claim 12 states “wherein the cost model models costs for at least one merchandise store.” See the specification as filed at page 74, lines 14-17.

Claim 14 states “wherein the cost model models costs as the sum of a bag cost, a location inventory cost, a checkout labor cost, a location receiving cost, a transportation cost, a distribution center inventory cost, a distribution center labor cost, an invoice processing cost, a location space cost, and a distribution center space cost.” See the specification as filed at page 74, lines 8-17; Figure 5.

Claim 15 states “wherein the econometric engine is coupled to a coefficient estimator, wherein the coefficient estimator generates a combined product sales model, a share model and a sales model.” See the specification as filed at page 60, lines 5-13; Figure 3, part 308.

Claim 16 states “wherein the coefficient estimator outputs the combined product sales model to the optimization engine, and wherein the optimization engine generates optimized pricing for the products from the combined product sales model and cost model.” See the specification as filed at page 97, line 20 to page 98, line 16; Figure 4, part 112.

Claim 17 states “wherein the coefficient estimator receives imputed variables from the econometric engine and sales data from the at least one merchandise store.” See the specification as filed at page 60, lines 5-13; Figure 3, part 308.

Claim 18 states “wherein the combined product sales model is given by:

$$\hat{D}_{i,k,t} = \hat{F}_{i,k,t} \hat{S}_{i,t}$$

where,

k = a product

i = a primary demand group

t = a time period

$D_{i,k,t}$ = a demand for product k in demand group i in time period t

$F_{i,k,t}$ = a fraction of the demand group i equivalent sales comprised by the product

k in the time period t

$S_{i,t}$ = an equivalent sales of the demand group i in the period t .”

See the specification as filed at page 60, lines 5-13; page 63, lines 1-10; page 73, lines 5-8.

Claim 19 states “wherein the sales model is given by:

$$\left(\frac{\hat{S}_{i,t}}{S_{Bi,t}} \right) = \exp \left(\begin{aligned} & \hat{K}_i + \hat{\gamma}_i \frac{P_{i,t}}{\bar{P}_{i,t}} + \hat{\nu}_i M_{i,t} + \hat{\psi}_i X_{i,t} + \hat{\kappa}_i X_{i,t} \frac{P_{i,t}}{\bar{P}_{i,t}} + \sum_{n=1}^{\tau} \hat{\delta}_{i,n} \frac{\sum_{r=t-mn}^{t-m(n-1)-1} S_{i,r}}{\sum_{r=t-mn}^{t-m(n-1)-1} \bar{S}_{i,r}} + \sum_{j \neq i} \hat{\phi}_{i,j} \frac{\hat{S}_{j,t}}{\bar{S}_{j,t}} \\ & + \hat{\eta}_{i,t} \left(\frac{\bar{P}_{i,t} - \bar{\bar{P}}_{i,t}}{\bar{\bar{P}}_{i,t}} \right) + \hat{\pi}_i \frac{TS_t}{TS_i} + \hat{\theta}_i \frac{S_{i,t-7}}{\bar{S}_{i,t-7}} + \frac{\hat{\sigma}^2}{2} \end{aligned} \right)$$

where,

k = the product

i = the primary demand group

j = a secondary demand group

t = the time period

B = a baseline state of product

$S_{i,t}$ = the equivalent sales of the demand group i in the period t

$S_{Bi,t}$ = an equivalent baseline sales of the demand group i in the period t

TS_t = total sales for the merchandise store in the period t

\bar{TS}_t = total sales for a region in the period t

$P_{i,t}$ = an equivalent price of the demand group i in the time period t

$\bar{P}_{i,t}$ = an average equivalent price of the demand group i for the time period t

$\overline{P}_{i,t}$ = an average competitor equivalent price of the demand group i for the time period t

$M_{i,t}$ = a promotion level for the demand group i in the time period t

$X_{i,t}$ = a seasonality index for the demand group i in the time period t

γ_i = a price elasticity factor for the demand group i

ν_i = a promotion factor for the demand group i

ψ_i = a seasonality factor for the demand group i

κ_i = a seasonality-price interaction factor that measures the interaction of weighted average price deviations and seasonality for the demand group i

n = a number of time periods away from the time period t

$\delta_{i,n}$ = a time lag factor for the demand group i and the delay of n weeks

$\phi_{i,j}$ = a cross elasticity factor for the demand group i and the demand group j

$\eta_{i,t}$ = a competitive price factor for the demand group i measured with respect to the difference between the weighted average price of the demand group within the merchandise store and outside competitors

π_i = a traffic factor for the demand group i

θ_i = a day-of-week effect for the demand group i

$\hat{\sigma}^2$ = a mean square error of the sales model divided by 2

K_i = a constant associated with the demand group i ."

See the specification as filed at page 60, lines 5-13; page 63, lines 1-10; page 65, line 10 to page 69, line 1.

Claim 20 states "wherein the share model is given by:

$$\hat{F}_{i,k,t} = \frac{\exp\left\{\hat{\Lambda}_{i,k} + \hat{\rho}_{i,k}(P_{Ri,k,t}) + \sum_{p=1}^{n_p} \hat{\sigma}_{p,i,k}(M_{p,i,k,t}) + \sum_{n=1}^{\tau} \hat{\chi}_{i,k,n} \sum_{r=t-mn}^{t-m(n-1)-1} (F_{i,k,r})\right\}}{\sum_{l \in Dem_i} \exp\left\{\hat{\Lambda}_{i,l} + \hat{\rho}_{i,l}(P_{Ri,l,t}) + \sum_{p=1}^{n_p} \hat{\sigma}_{p,i,l}(M_{p,i,l,t}) + \sum_{n=1}^{\tau} \hat{\chi}_{i,l,n} \sum_{r=t-mn}^{t-m(n-1)-1} (F_{i,l,r})\right\}}$$

where,

k = the product

i = the primary demand group

t = the time period

n = the number of time periods away from the time period t

$F_{i,k,t}$ = the fraction of the demand group i equivalent sales comprised by the product k in the time period t

$P_{Bi,k,t}$ = an equivalent base price of the product k in the demand group i in the time period t

$\bar{P}_{Bi,(k),t}$ = an average equivalent base price of all products other than the product k in the demand group i for the time period t

$P_{RBi,k,t}$ = a relative equivalent base price of the product k in the demand group i for the time period t

$\bar{P}_{RBi,\bullet,t}$ = an average relative equivalent base price in the demand group i for the time period t

$M_{p,i,k,t}$ = a level of promotion type p for the product k in the demand group i in the time period t

$\rho_{i,k}$ = a relative base price elasticity factor for the product k in the demand group i

$\sigma_{p,i,k}$ = a promotion factor p for the product k in the demand group i

$\chi_{i,k,n}$ = a time lag factor for the product k in the demand group i and the delay of n

$\Lambda_{i,k}$ = a constant associated with the product k in the demand group i .”

See the specification as filed at page 60, lines 5-13; page 63, lines 1-10; page 69, line 5 to page 71, line 4.

Claims 21-23 state “wherein the econometric engine [financial engine and coefficient estimator are] computer readable medium that has computer code thereon for performing computer implemented operations.” See the specification as filed at page 116, lines 2-13; Figure 7B, parts 926, 914 and 924.

Appellants assert that all pending Claims 3, 4, 6, 11, 12 and 14-23 are novel and non-obvious over the cited art for all the reasons given below.

VI. GROUND OF REJECTION TO REVIEWED ON APPEAL

The Board is being asked to review the final rejection of Claims 3, 4, 6, 11, 12 and 14-20 under 35 U.S.C. 112. Also, the Board is being asked to review the final rejection of Claims 3 and 4 under 35 U.S.C. 103 as being unpatentable over Dulaney et al. (US 6,341,269), in view of Official Notice. Additionally, Board is being asked to review the final rejection of Claims 6, 11, 12 and 14-23 as being unpatentable over Dulaney et al. (US 6,341,269), in view of Alan L. Montgomery and Peter E. Rossi, and further in view of Maeda et al. (US 5,377,095).

VII. REMARKS/ARGUMENTS

Appellants thank the Appeal Board for the review of this Appeal Brief. Appellants will now address the patentability of the present invention, with particular attention paid to the rejections made by the Examiner in response to the Amendment dated August 17, 2008, which is hereby incorporated by reference.

For the sake of clarity, Appellants have divided the arguments into various subsections; however, this is not intended to be limiting of the arguments contained therein. Thus, arguments in one subsection may be applied to all applicable subsections.

A. RESPONSE TO REJECTION OF THE CLAIMS UNDER 35 USC §112

Examiner rejected Claims 3, 4, 6, 11, 12 and 14-20 under 35 USC 112 under first paragraph. Particularly, the Examiner stated that “there is a lack of structure” to the claims. The Examiner takes issue with the econometric engine, financial engine, and coefficient estimator in that she “is unclear as to what it does but not what it is.” Appellants believe that there is no basis for such rejections.

The apparatus of base Claim 3 consists of various “engines” and an “estimator”. Each engine and the estimator have been linked to one another as to enable one skilled in the art to

understand the “structure” of the invention. The exact physical form said invention takes, when the claims are read in the broadest reasonable way, is not specified. However, the specification as filed at page 116, line 4 to page 118, line 13 states:

“**a computer system 900, which forms part of the network 10 and is suitable for implementing embodiments of the present invention.** FIG. 7A shows one possible physical form of the computer system. Of course, the computer system may have many physical forms ranging from an integrated circuit, a printed circuit board, and a small handheld device up to a huge super computer ... **embodiments of the present invention further relate to computer storage products with a computer-readable medium** that have computer code thereon for performing various computer-implemented operations. The media and computer code may be those specially designed and constructed for the purposes of the present invention, or they may be of the kind well known and available to those having skill in the computer software arts.” (Emphasis Added).

The statute under 35 USC 112 states that “the **specification** shall contain a written description of the invention, and of the manner and process of making and using it...” (Emphasis Added). Appellants believe that the specification, and claims when read in light of the specification, adequately describes the function and form of the invention as to enable one of even basic skill in the art to make and use the invention. There is no question then that one of ordinary skill in the art would likewise be able to make and use the present invention. As such, the Appellants believe that the Examiner was misinterpreting the present invention, and that the rejection under 35 USC 112 is erroneous.

B. RESPONSE TO REJECTION OF THE CLAIMS UNDER 35 USC §103

The Examiner has additionally rejected pending Claims 3 and 4 under 35 U.S.C. 103 as being unpatentable over Dulaney et al. (US 6,341,269), in view of Official Notice. Additionally, the Examiner rejected Claims 6, 11, 12 and 14-23 as being unpatentable over Dulaney et al. (US 6,341,269), in view of Alan L. Montgomery and Peter E. Rossi, and further in view of Maeda et al. (US 5,377,095).

Appellants believe that the present invention is nonobvious over Dulaney, official notice, Alan L. Montgomery and Peter E. Rossi, and Maeda because the cited references neither teach nor suggest each and every element of claims 3, 4, 6, 11, 12 or 14-23.

“A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *Graham v. John Deere Co.*, 383 U.S. 1, 13 (1966). Further, “[t]o establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.” *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974); MPEP 2143.03.

Appellants believe that there is no basis for an obviousness rejection. In response to this rejection, Appellants will provide a brief discussion of the prior art and discuss the specific rejections of related claims below.

1. DISCUSSION AND CHARACTERIZATION OF THE CITED PRIOR ART

The main reference relied upon by the Examiner in the rejection of the present invention is Dulaney et al. Dulaney discloses “a system . . . that optimizes inventory and merchandising **shelf space utilization** based upon cost and lost sales.” (Emphasis Added). (See Column 1, lines 10 to 15). Dulaney further discloses that the “optimization employs a ‘brute force’ method for determining the optimal number of facings.” (See Column 12, lines 1-9). Thus, “[a]t each step the system checks to see if the total cost increases by increasing the number of facings by one or if the economic profit decreases by incrementing the facings by one.” *Id.*

Dulaney describes the utilization of ‘shelf space’ in an optimal manner by brute force calculations of cost of shelving to profit. The cost determinations in Dulaney are concerned with the changes in cost associated with increased items in an inventory, and do not consider overall costs for the product.

Montgomery and Rossi, on the other hand, disclose “how price elasticity estimates can be improved in demand systems that involve multiple brands and stores [by] treat[ing] these

demand models in a hierarchical Bayesian framework.” (See Abstract). Additionally, Montgomery and Rossi disclose “a new Bayesian approach that uses an additive utility model as the basis for prior information in a hierarchical setting.” (See page 414, paragraph 4).

Montgomery and Rossi appear to be directed to the generation of pricing elasticities. These pricing elasticity calculations do not appear to require the inclusion of product cost data. Additionally, Montgomery and Rossi do not provide any discussion of product cost, or the generation of a cost model.

Lastly, Maeda et al. relates generally to “prediction of the sales of an item in the case where the price of the item is set to a value.” (See Column 1, lines 50-55). As with Montgomery and Rossi, Appellants believe Maeda is directed to the generation of coefficients for the modeling of sales, and fails to disclose any discussion of product cost, or the generation of a cost model.

2. NON-ANALOGOUS ART

Appellants believe that all of the cited art is non-analogous art, and is thus inappropriate for use as prior art. This argument is made in addition to the distinguishing arguments found below.

The court has found “the similarities and differences in structure and function of the inventions to carry far greater weight” in determining if references are analogous art. *In re Ellis*, 476 F.2d 1370, 1372, 177 USPQ 526, 527 (CCPA 1973). As previously discussed, Dulaney teaches a system and method for optimizing inventory and merchandising **shelf space utilization** based upon cost and lost sales. See Column 1, lines 10 to 15. Montgomery and Rossi disclose the generation of estimated price elasticities for generation of prices. See Abstract. Lastly, Maeda discloses predicting the sales of an item where the price of the item is set to a particular value. See Column 1, lines 50-55.

Contrary, the present invention discloses **generation of cost models for a product given a demand group**. See the Specification as filed at page 74, lines 1-9.

Both Maeda and Montgomery and Rossi never appear to discuss **cost modeling in any fashion**. In fact, Appellants believe that the only similarity between Maeda and Montgomery and Rossi and the present invention is the fact that in addition to the claimed cost modeling, the present invention additionally discloses generating optimized prices for products; however, this is the apparent end of any similarities. Appellants assert that predicting sales and estimating elasticity of Maeda and Montgomery and Rossi, respectively, is distinct from and unrelated to cost modeling as claimed. As such, rejections to Claims 6, 11, 12 or 14-23 are believed moot, and Claims 6, 11, 12 or 14-23 are believed allowable.

Moreover, while Dulaney does discuss determining cost as a factor in determining the shelf space desired for a product, this cost calculation is greatly limited in scope as compared to the cost modeling of the present invention. See Column 2, lines 12-21. Additionally, when viewed as a whole, the cost modeling of the present invention is generated as including all levels of an organization hierarchy, and this cost model is used to generate optimal pricing for a given product, whereas in Dulaney only costs associated with stocking, holding and lost sales are considered for the generation of an inventory shelf space management plan. *Id.* As such, the function and scope of Dulaney is believed to be very different from that of the present invention. As such, rejections to Claims 3, 4, 6, 11, 12 or 14-23 are believed moot, and Claims 3, 4, 6, 11, 12 or 14-23 are believed allowable.

3. REGARDING THE COMBINATION OF CITED ART

Appellants assert that there is insufficient evidence of record of a motivation to combine Dulaney with either of Alan L. Montgomery and Peter E. Rossi, or Maeda in a manner meeting the invention as recited in claims 3, 4, 6, 11, 12 or 14-23.

It has been found that “[w]hen obviousness is based on the teachings of multiple prior art references, the movant must also establish some ‘suggestion, teaching, or motivation’ that would have led a person of ordinary skill in the art to combine the relevant prior art teachings in the manner claimed.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1391

(2007). The Court in *KSR* affirmed the Teaching, Suggestion, or Motivation (TSM) Test for determining the appropriateness of the combination of prior art.

While the rationale to modify or combine the prior art does not have to be expressly stated in the prior art, the Examiner must present a convincing line of reasoning supporting the rejection. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988); *Ex parte Clapp*, 227 USPQ 972 (Bd. Pat. App. & Inter. 1985).

Appellants assert that Dulaney fails to provide a teaching, suggestion or motivation to be combined with either of Alan L. Montgomery and Peter E. Rossi, or Maeda. Likewise, Alan L. Montgomery and Peter E. Rossi, and Maeda both fail to provide a teaching, suggestion or motivation to be combined with Dulaney. The Examiner in support of the combination stated that “it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Maeda in Dulaney because such an incorporation would allow Dulaney to have respective coefficients for all functions registered in a function registration portion to be calculated on the basis of retrieved data.”

The holding in *KSR* allows Examiners greater leeway in deciding what rises to the level of a “motivation to combine.” Examiners may now look to inferences (interrelated teachings of multiple patents), a need in the art (marketplace demands), or common sense (background knowledge possessed by one of ordinary skill in the art) in support of an obviousness rejection.

Appellants, however, respectfully believe the Examiner’s comments mischaracterize Dulaney, and that there is insufficient motivation to combine Dulaney with Maeda or Montgomery and Rossi, in that Dulaney does not disclose the usage of coefficients in the determination of inventory shelf spacing. At most, Dulaney discloses using ‘demand’ for a product to determine the needed shelf space; however, the ‘demand’ disclosed in Dulaney is merely a measure of daily sales and variability of daily sales. (See Column 2, lines 62-67).

As such, given the great discrepancies between the goals and function of Dulaney and Montgomery and Rossi, or Maeda it is believed there is no motivation for this combination of

prior art. As none of the prior art alone discloses all of the limitations of Claims 3, 4, 6, 11, 12 or 14-23 the lack of motivation to combine the prior art renders the present invention novel and nonobvious.

4. REGARDING CLAIM 3

Claim 3 has been rejected by the Examiner in light of Dulaney et al. (US 6,341,269), in view of Official Notice. Appellants believe this rejection is erroneous and unfounded. Below is a listing of arguments where Dulaney is contrasted with the Claimed invention. It will become clear that Dulaney et al. and Official Notice do not make the present invention obvious in that they differ greatly in regard to scope, breadth, thrust and means of accomplishing their respective objectives.

i. Dulaney Fails to Suggest Imputing Missing Data

The Examiner rejected Claim 3 stating “Dulaney discloses ... an econometric engine for ... **generating imputed variables** by imputing at least one missing data point (col. 4, line 5-col. 5, line 5);” (Emphasis Added).

Appellants believe that Dulaney does not provide “imputing” of missing data points as claimed in Claim 3. The Examiner took Official Notice that cleansing data is old and well known; however, known data cleansing techniques do not include ‘imputation’ of missing data. Moreover, the citation by the Examiner discusses the general overview of the ‘facing optimization’ process. See Column 4, line 5-column 5, line 5. After a thorough read, Appellants believe that imputation of missing data, or even data replacement, is not taught or suggested by Dulaney.

Thus, the econometric engine, capable of imputing missing data points, claimed by the present invention is simply not found in Dulaney. Base Claim 3 is believed allowable for at least

these reasons. As such, Claims 4, 6, 11, 12 or 14-23, which depend therefrom, are likewise believed allowable for depending upon an allowable parent claim.

ii. Dulaney Fails to Suggest Creating Demand Groups

The Examiner also rejected Claim 3 stating “Dulaney discloses ... generating a cost model, and outputting the cost model to the optimization engine (col. 5, line 6-col. 6, line 22), wherein said cost model models costs for individual products in said each of the at least one merchandise store **for a selected demand group** in a selected time period, further **wherein said demand group is a group of highly substitutable products** (col. 12, line 1-col. 15, line 51).” (Emphasis Added).

Appellants believe that Dulaney does not modeling costs for groupings of products at all, let alone demand groups which are groupings of highly substitutable products, as claimed in Claim 3. In fact, Dulaney appears to teach away from this limitation by stating “[t]he process of facing optimization requires the assimilation of relevant data **for each particular item** to be evaluated.” See Column 2, line 55-57. Appellants believe that modeling costs by demand groups is not taught or suggested by Dulaney.

Thus, the financial engine, capable of modeling costs by demand groups, claimed by the present invention is simply not found in Dulaney. Base Claim 3 is believed allowable for at least these reasons. As such, Claims 4, 6, 11, 12 or 14-23, which depend therefrom, are likewise believed allowable for depending upon an allowable parent claim.

iii. Dulaney Fails to Suggest the Optimization Engine

The Examiner also rejected Claim 3 stating “Dulaney discloses ... outputting the cost model to the optimization engine (col. 5, line 6-col. 6, line 22)” wherein “the optimization engine is further configured to generate a preferred set of prices.”

Appellants believe that Dulaney discloses the “optimization” of product inventories for stocking and shelf space utilization. See Column 1, lines 10-16. Appellants believe that Dulaney fails to teach or suggest an “optimization engine ... configured to generate a preferred set of prices” as in the present invention. Thus, it is a logical necessity that Dulaney likewise fails to teach or suggest “outputting the cost model to the optimization engine” in the manner of Claim 3.

Thus, the financial engine, capable of outputting cost models for price setting, claimed by the present invention is simply not found in Dulaney. Base Claim 3 is believed allowable for at least these reasons. As such, Claims 4, 6, 11, 12 or 14-23, which depend therefrom, are likewise believed allowable for depending upon an allowable parent claim.

5. REGARDING CLAIM 6

The Examiner also rejected Claim 6 stating “Montgomery and Rossi teach, wherein the imputed variables include at least one of a seasonality variable, a promotional variable and a cross-elasticity variable (page 414, col. 2, paragraph 2-page 415, paragraph 1).”

Appellants agree that Montgomery and Rossi discuss cross elasticity variables; however, Appellants assert that there is no **imputation** of these variables. See page 414, column 2, paragraph 2. Thus, Claim 6 is believed allowable for at least these reasons.

6. REGARDING CLAIM 14

Regarding Claim 14, the Examiner stated “Official Notice is taken that it is old and well known in the art of inventory, sales, and merchandising to model costs as the sum of bag cost (number of bags needed and used), location inventory cost, a checkout labor cost (cost for persons checking out customers or employee costs), location receiving cost, transportation cost, a distribution center inventory cost, a distribution center labor cost, an invoice processing cost, a location space cost, and a distribution center space cost to arrive at a cost mode and the cost of running merchandise sales business.”

Appellants respectfully traverse the Examiner's rejection. Particularly, Appellants assert that they believe that it is not well known in the art of **cost modeling for price optimizations** to include **each** of these costs in the **particular combination** disclosed in Claim 14. Appellants respectfully requested some showing that these cost parameters are 'old' and 'well known' in the price optimization field.

The Examiner did not provide any showing in response to said request, and as such Appellants believe that the "cost model models costs as the sum of a bag cost, a location inventory cost, a checkout labor cost, a location receiving cost, a transportation cost, a distribution center inventory cost, a distribution center labor cost, an invoice processing cost, a location space cost, and a distribution center space cost" of Claim 14 is novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

7. REGARDING CLAIM 15

Regarding Claim 15, the Examiner stated that "Maeda discloses ... a coefficient estimator, wherein the coefficient estimator generates a combined product sales model, a share model and a sales model (col. 10, lines 47-68)."

Appellants concede that Maeda discloses generating sales models; however, Maeda fails to disclose the combined product sales model and share model. See column 4, lines 47-64; column 6, lines 43-54; and column 10, lines 47-68.

Contrary, the disclosed invention uses a sophisticated "combined product sales model" and a "share model" as well as single product "sales models". Thus, the coefficient estimator, capable of generating share and combined sales models, claimed by the present invention is simply not found in Maeda. As such, Claim 15 is believed allowable for at least these reasons.

8. REGARDING CLAIM 16

Regarding Claim 16, the Examiner stated that "Dulaney discloses ... wherein the coefficient estimator outputs the combined product sales model to the optimization engine, and

wherein **the optimization engine generates optimized pricing** for the products from the combined product sales model and cost model (col. 18, lines 28-51).” (Emphasis Added).

As noted above, Appellants believe that Dulaney discloses the “optimization” of product **inventories for stocking and shelf space utilization**. See Column 1, lines 10-16. Appellants believe that Dulaney fails to teach or suggest generation of optimized product **pricing**.

In contrast, Claim 16 discloses “the optimization engine generates optimized pricing.” Thus, Claim 16 is believed novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

9. REGARDING CLAIM 18

Regarding Claim 18, the Examiner stated that “Dulaney discloses ... the combined product sales model ... (col. 12, line 11- col. 15, line 58 and col. 16, line 16- col. 18, line 40).”

Appellants respectfully traverse this rejection. The “data elements” used in the cited art are used to calculate a “matrix” for a “brute force” optimization for the “optimal number of facings.” See column 12, line 1 to column 15, line 38. Appellants assert that the **objective, function-type and variables differ** between the cited art and the “combined product sales model” disclosed by Claim 18.

On top of being a model based upon a different function type than that disclosed in the cited art, the disclosed invention includes variables not found in the cited art. Particularly, “ $D_{i,k,t}$ = a demand for product k in demand group i in time period t ... $F_{i,k,t}$ = a fraction of the demand group i equivalent sales comprised by the product k in the time period t ... $S_{i,t}$ = an equivalent sales of the demand group i in the period t .” are all not found within the “elements” disclosed in Dulaney.

As the formulas in Dulaney differ in variables included, function type, result of the function, and scope, there is no similarities between the “combined product sales model” of the present invention and the formulas disclosed in Dulaney. Thus, Claim 18 is believed novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

10. REGARDING CLAIM 19

Regarding Claim 19, the Examiner stated that “Dulaney discloses ... the sales model ... (col. 12, line 11- col. 15, line 58 and col. 16, line 16- col. 18, line 40).”

As with the traversal argued above, Appellants assert that the objective, function-type and variables differ greatly between the cited art and the “sales model” disclosed by Claim 19.

On top of being a model based upon a different function type than that disclosed in the cited art, the disclosed invention includes variables not found in the cited art, as well.

Particularly, “ i = the primary demand group

j = a secondary demand group

...

B = a baseline state of product

$S_{i,t}$ = the equivalent sales of the demand group i in the period t

$S_{Bi,t}$ = an equivalent baseline sales of the demand group i in the period t

...

$P_{i,t}$ = an equivalent price of the demand group i in the time period t

$\bar{P}_{i,t}$ = an average equivalent price of the demand group i for the time period t

$\overline{\bar{P}}_{i,t}$ = an average competitor equivalent price of the demand group i for the time period t

$M_{i,t}$ = a promotion level for the demand group i in the time period t

$X_{i,t}$ = a seasonality index for the demand group i in the time period t

γ_i = a price elasticity factor for the demand group i

ν_i = a promotion factor for the demand group i

ψ_i = a seasonality factor for the demand group i

κ_i = a seasonality-price interaction factor that measures the interaction of weighted average price deviations and seasonality for the demand group i

...

$\delta_{i,n}$ = a time lag factor for the demand group i and the delay of n weeks

$\phi_{i,j}$ = a cross elasticity factor for the demand group i and the demand group j

$\eta_{i,t}$ = a competitive price factor for the demand group i measured with respect to the difference between the weighted average price of the demand group within the merchandise store and outside competitors

π_i = a traffic factor for the demand group i

θ_i = a day-of-week effect for the demand group i

...

K_i = a constant associated with the demand group i ” are all not found within the “elements” disclosed in Dulaney.

As the formulas in Dulaney differ in variables included, function type, result of the function, and scope, there is no similarities between the “sales model” of the present invention and the formulas disclosed in Dulaney. Thus, Claim 19 is believed novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

11. REGARDING CLAIM 20

Regarding Claim 20, the Examiner stated that “Dulaney discloses ... the share model ... (col. 12, line 11- col. 15, line 58 and col. 16, line 16- col. 18, line 40).”

As with the previous two traversals argued above, Appellants assert that the objective, function-type, and variables differ greatly between the cited art and the “share model” disclosed by Claim 20.

On top of being a model based upon a different function type than that disclosed in the cited art, the disclosed invention includes variables not found in the cited art, as well. Particularly, “ i = the primary demand group

...

$F_{i,k,t}$ = the fraction of the demand group i equivalent sales comprised by the product k in the time period t

$P_{Bi,k,t}$ = an equivalent base price of the product k in the demand group i in the time period t

$\bar{P}_{Bi,(k),t}$ = an average equivalent base price of all products other than the product k in the demand group i for the time period t

$P_{RBi,k,t}$ = a relative equivalent base price of the product k in the demand group i for the time period t

$\bar{P}_{RBi,\bullet,t}$ = an average relative equivalent base price in the demand group i for the time period t

$M_{p,i,k,t}$ = a level of promotion type p for the product k in the demand group i in the time period t

$\rho_{i,k}$ = a relative base price elasticity factor for the product k in the demand group i

$\sigma_{p,i,k}$ = a promotion factor p for the product k in the demand group i

$\chi_{i,k,n}$ = a time lag factor for the product k in the demand group i and the delay of n

$\Lambda_{i,k}$ = a constant associated with the product k in the demand group i are all not found within the “elements” disclosed in Dulaney.

As the formulas in Dulaney differ in variables included, function type, result of the function, and scope, there is no similarities between the “share model” of the present invention and the formulas disclosed in Dulaney. Thus, Claim 20 is believed novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

C. CONCLUSION

In sum, Appellants believe that all pending Claims 3, 4, 6, 11, 12 and 14-23 are allowable over the cited art and are also in allowable form and respectfully request a Notice of Allowance for this application from the Appeal Board. The commissioner has been authorized to charge our credit card (via EFS) in the amount of \$540 (Appeal Brief fee). The commissioner is authorized to charge any additional fees that may be due or credit any overpayment to our Deposit Account No. 50-2766 (Order No. DT-0004). Should the Appeal Board believe that a telephone conference would expedite the prosecution of this appeal; the undersigned can be reached at telephone number 925-570-8198.

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VIII. LISTING OF CLAIMS APPENDIX:

What is claimed is:

1. (Previously Withdrawn) In a computer system, a computer-implemented method for modeling cost, useful in association with at least one merchandise store and an optimization engine coupled to the computer system via a network, wherein the at least one merchandise store includes at least one of a brick-and-mortar store, an online store, and a catalog store, the computer-implemented method comprising:

receiving sales data, using the computer system, from the at least one merchandise store via the network;

cleansing the sales data, using the computer system;

generating imputed variables, using the computer system, by imputing at least one missing data point;

receiving cost data, using the computer system, from the at least one merchandise store via the network;

estimating cost per unit of product, using the computer system, from the sales data, the imputed variables and the cost data; and

outputting the estimated cost per unit of product, using the computer system, to the optimization engine via the network.

2. (Previously Withdrawn) The computer-implemented method, as recited in claim 1, wherein the determining the cost per unit of product comprises estimating inventory space in the merchandise store used by the product, which is estimated from sales data indicating volume of sales of the product and cost data indicating the frequency of product delivery.

3. An apparatus for modeling costs, useful in association with an optimization engine and at least one merchandise store coupled to the apparatus via a network, wherein the at least one merchandise store includes at least one of a brick-and-mortar store, an online store, and a catalog store, and wherein the optimization engine is configured to receive input from the apparatus, and wherein the optimization engine is further configured to generate a preferred set of prices, the apparatus comprising:

an econometric engine for receiving sales data from at least one merchandise store via the network, cleansing the sales data and generating imputed variables by imputing at least one missing data point; and

a financial engine for receiving imputed variables from the econometric engine, receiving cost data from at least one merchandise store via the network, generating a cost model for at least one product, and outputting the cost model to the optimization engine, wherein the cost model models costs of the at least one product given the merchandise store, a demand group and a selected time period, and wherein the demand group is a group of highly substitutable products.

4. The apparatus, as recited in claim 3, wherein the financial engine estimates inventory space in the at least one merchandise store used by a product from the sales data and delivery data.

5. (Previously Withdrawn) The computer-implemented method, as recited in claim 1, wherein the imputed variables include at least one of a seasonality variable, a promotional variable and a cross-elasticity variable.

6. The apparatus, as recited in claim 3, wherein the imputed variables include at least one of a seasonality variable, a promotional variable and a cross-elasticity variable.

7. (Previously Withdrawn) The computer-implemented method, as recited in claim 5, wherein said estimating cost per unit of product step includes estimating fixed costs and estimating variable costs, further wherein said variables costs are a function of the amount of sales of said product and said fixed costs are not a function of the amount of sales of said product.

8. (Previously Withdrawn) The computer-implemented method, as recited in claim 7, wherein said estimating cost are estimated for each of the at least one merchandise store.

9. (Previously Withdrawn) The computer-implemented method, as recited in claim 8, wherein said estimated cost per unit of product is determined as a cost for said product in said each of the at least one merchandise store for a selected demand group in a selected time period, further wherein said demand group is a group of highly substitutable products.

10. (Previously Withdrawn) The computer-implemented method, as recited in claim 9, wherein said estimated cost per unit of product in said merchandise store is determined as the sum of a bag cost, a location inventory cost, a checkout labor cost, a location receiving cost, a transportation cost, a distribution center inventory cost, a distribution center labor cost, an invoice processing cost, a location space cost, and a distribution center space cost.

11. The apparatus, as recited in claim 6, wherein the cost model includes fixed costs and variable costs, further wherein the variable costs are a function of the amount of sales of the product and the fixed costs are not a function of the amount of sales of the product.

12. The apparatus, as recited in claim 11, wherein the cost model models costs for at least one merchandise store.

13. (Previously cancelled)

14. The apparatus, as recited in claim 12, wherein the cost model models costs as the sum of a bag cost, a location inventory cost, a checkout labor cost, a location receiving cost, a transportation cost, a distribution center inventory cost, a distribution center labor cost, an invoice processing cost, a location space cost, and a distribution center space cost.

15. The apparatus, as recited in claim 12, wherein the econometric engine is coupled to a coefficient estimator, wherein the coefficient estimator generates a combined product sales model, a share model and a sales model.

16. The apparatus, as recited in claim 15, wherein the coefficient estimator outputs the combined product sales model to the optimization engine, and wherein the optimization engine generates optimized pricing for the products from the combined product sales model and cost model.

17. The apparatus, as recited in claim 15, wherein the coefficient estimator receives imputed variables from the econometric engine and sales data from the at least one merchandise store.

18. The apparatus, as recited in claim 17, wherein the combined product sales model is given by:

$$\hat{D}_{i,k,t} = \hat{F}_{i,k,t} \hat{S}_{i,t}$$

where,

k = a product

i = a primary demand group

t = a time period
 $D_{i,k,t}$ = a demand for product k in demand group i in time period t
 $F_{i,k,t}$ = a fraction of the demand group i equivalent sales comprised by the product k in the time period t
 $S_{i,t}$ = an equivalent sales of the demand group i in the period t .

19. The apparatus, as recited in claim 17, wherein the sales model is given by:

$$\left(\frac{\hat{S}_{i,t}}{S_{Bi,t}} \right) = \exp \left(\begin{aligned} & \hat{K}_i + \hat{\gamma}_i \frac{P_{i,t}}{\bar{P}_{i,t}} + \hat{\nu}_i M_{i,t} + \hat{\psi}_i X_{i,t} + \hat{\kappa}_i X_{i,t} \frac{P_{i,t}}{\bar{P}_{i,t}} + \sum_{n=1}^{\tau} \hat{\delta}_{i,n} \frac{\sum_{r=t-mn}^{t-m(n-1)-1} S_{i,r}}{\sum_{r=t-mn}^{t-m(n-1)-1} \bar{S}_{i,r}} + \sum_{j \neq i} \hat{\phi}_{i,j} \frac{\hat{S}_{j,t}}{\bar{S}_{j,t}} \\ & + \hat{\eta}_{i,t} \left(\frac{\bar{P}_{i,t} - \bar{\bar{P}}_{i,t}}{\bar{\bar{P}}_{i,t}} \right) + \hat{\pi}_i \frac{TS_t}{\bar{TS}_t} + \hat{\theta}_i \frac{S_{i,t-7}}{\bar{S}_{i,t-7}} + \frac{\hat{\sigma}^2}{2} \end{aligned} \right)$$

where,

k = the product
 i = the primary demand group
 j = a secondary demand group
 t = the time period
 B = a baseline state of product
 $S_{i,t}$ = the equivalent sales of the demand group i in the period t
 $S_{Bi,t}$ = an equivalent baseline sales of the demand group i in the period t
 TS_t = total sales for the merchandise store in the period t
 \bar{TS}_t = total sales for a region in the period t
 $P_{i,t}$ = an equivalent price of the demand group i in the time period t
 $\bar{P}_{i,t}$ = an average equivalent price of the demand group i for the time period t
 $\bar{\bar{P}}_{i,t}$ = an average competitor equivalent price of the demand group i for the time period t
 $M_{i,t}$ = a promotion level for the demand group i in the time period t
 $X_{i,t}$ = a seasonality index for the demand group i in the time period t
 γ_i = a price elasticity factor for the demand group i
 ν_i = a promotion factor for the demand group i
 ψ_i = a seasonality factor for the demand group i

κ_i = a seasonality-price interaction factor that measures the interaction of weighted average price deviations and seasonality for the demand group i
 n = a number of time periods away from the time period t
 $\delta_{i,n}$ = a time lag factor for the demand group i and the delay of n weeks
 $\phi_{i,j}$ = a cross elasticity factor for the demand group i and the demand group j
 $\eta_{i,t}$ = a competitive price factor for the demand group i measured with respect to the difference between the weighted average price of the demand group within the merchandise store and outside competitors
 π_i = a traffic factor for the demand group i
 θ_i = a day-of-week effect for the demand group i
 $\hat{\sigma}^2$ = a mean square error of the sales model divided by 2
 K_i = a constant associated with the demand group i

20. The apparatus, as recited in claim 17, wherein the share model is given by:

$$\hat{F}_{i,k,t} = \frac{\exp\left\{\hat{\Lambda}_{i,k} + \hat{\rho}_{i,k}(P_{Ri,k,t}) + \sum_{p=1}^{n_p} \hat{\sigma}_{p,i,k}(M_{p,i,k,t}) + \sum_{n=1}^{\tau} \hat{\chi}_{i,k,n} \sum_{r=t-mn}^{t-m(n-1)-1} (F_{i,k,r})\right\}}{\sum_{l \in Dem_i} \exp\left\{\hat{\Lambda}_{i,l} + \hat{\rho}_{i,l}(P_{Ri,l,t}) + \sum_{p=1}^{n_p} \hat{\sigma}_{p,i,l}(M_{p,i,l,t}) + \sum_{n=1}^{\tau} \hat{\chi}_{i,l,n} \sum_{r=t-mn}^{t-m(n-1)-1} (F_{i,l,r})\right\}}$$

where,

k = the product
 i = the primary demand group
 t = the time period
 n = the number of time periods away from the time period t
 $F_{i,k,t}$ = the fraction of the demand group i equivalent sales comprised by the product k in the time period t
 $P_{Bi,k,t}$ = an equivalent base price of the product k in the demand group i in the time period t
 $\bar{P}_{Bi,(k),t}$ = an average equivalent base price of all products other than the product k in the demand group i for the time period t
 $P_{RBi,k,t}$ = a relative equivalent base price of the product k in the demand group i for the time period t

$\bar{P}_{R Bi, \bullet, t}$ = an average relative equivalent base price in the demand group i for the time period t

$M_{p, i, k, t}$ = a level of promotion type p for the product k in the demand group i in the time period t

$\rho_{i, k}$ = a relative base price elasticity factor for the product k in the demand group i

$\sigma_{p, i, k}$ = a promotion factor p for the product k in the demand group i

$\chi_{i, k, n}$ = a time lag factor for the product k in the demand group i and the delay of n

$\Lambda_{i, k}$ = a constant associated with the product k in the demand group i

21. The apparatus, as recited in claim 3, wherein the econometric engine is a computer readable medium that has computer code thereon for performing computer implemented operations.

22. The apparatus, as recited in claim 3, wherein the financial engine is a computer readable medium that has computer code thereon for performing computer implemented operations.

23. The apparatus, as recited in claim 15, wherein the coefficient estimator is a computer readable medium that has computer code thereon for performing computer implemented operations.

IX. EVIDENCE APPENDIX

none

X. RELATED PROCEEDINGS APPENDIX

none